Fermilab Accelerator Advisory Committee
July 28-30, 2010

Charge (Draft Rev. 2)

The Fermilab Accelerator Advisory Committee is asked to look at activities in three distinct areas related to the development of future programs. The three primary topics for review and discussion are:

1. Proposed Tevatron Collider Studies Following the End of Collider Operations

The Tevatron Collider program is scheduled to end on October 1, 2011. The end of operations offers a unique opportunity to utilize the accelerator complex for a number of studies that could either advance generic knowledge of accelerator physics phenomena in colliders, or provide specific knowledge of utility in maximizing performance of the LHC over the coming decade. A proposal for an extended (4-8 weeks) has been prepared by interested parties at Fermilab, CERN, BNL and elsewhere.

The Committee is asked to review and offer comments/recommendations relative to the end-of-run Tevatron studies proposal. In particular we request specific comments and recommendations in the following areas:

- Are goals of the study period well defined?
- What aspects of the proposal are most compelling in terms of advancing the world's knowledge of the accelerator physics phenomena in high energy proton colliders?
- What aspects of the proposal are most compelling in terms of providing information required to maximize performance of the LHC over the upcoming decade?
- Is the accompanying studies plan/schedule well structured to achieve the goals outlined?

More generally, we would be happy to receive comments and suggestions from the AAC on how the studies plan could be strengthened.

2. Advanced Accelerator R&D Program at A0 and the New Muon Lab (NML)

The photoinjector that has resided at A0 for more than a decade is scheduled to be relocated to NML in 2011 in order to provide direct support of the ILC rf unit test. This move affords the opportunity for development of a world-class program of Advanced Accelerator R&D based on the photoinjector and the ILC cryomodules. The Committee will be presented with an overview

of a potential program that could be mounted at NML beyond 2012 and beyond. Fermilab would like the AAC's advice in identifying potential activities that could form the basis of a competitive proposal for AARD to be submitted to DOE.

The Committee is asked to review the scientific possibilities for an AARD program based on the relocated photoinjector and the ILC cryomodule string that will be operational at NML beyond 2012. We are particularly interested in the Committee's comments and recommendations relative to the following:

- Identify those elements of the potential program that hold the highest scientific interest within both a national and international context.
- Identify those characteristics of the NML facility that are unique, and suggest how those characteristics might best be capitalized on.
- Any further suggestions on the development of a competitive proposal are appreciated.

In addition, Fermilab has received a proposal from Northern Illinois University, and our own Accelerator Physics Center, for a Source Development Laboratory at A0 following the departure of the photoinjector. The Committee is asked to review this proposal and offer advice in the following areas:

- How compelling and timely are the scientific objectives?
- How credible is the plan for achieving the objectives?
- What are the opportunities for development of the facility beyond initial objectives?

3. Concepts for Evolving Project X into a Muon Collider Front End

An important mission of Project X is to provide a basis for the eventual development of a muon based facility (Neutrino Factory or Muon Collider) on the Fermilab site. It is important to Fermilab to understand in the early design stages what the requirements on Project X might be, and what upgrades or auxiliary facilities might be required, to support muon applications. The effort in defining requirements and upgrade paths has just begun, and we would like the committee to look at and comment on the approach.

Specifically, we would like feedback from the Committee on the following points:

- Have the fundamental physics/technical issues that need to overcome to utilize Project X as a muon front end been identified?

- What is the level of understanding relative to translating these issues into performance requirements for Project X, either in its initial or upgraded configuration?
- Do the general concepts outlined lead one to conclude that an upgrade path should, in principle, exist?
- Does the program of study proposed provide confidence that such an upgrade path, and corresponding requirements on Project X, could be established over the next two years?

As usual the committee is invited to issue comments or suggestions on any aspect of the programs discussed beyond those specifically included in this charge. It is requested that a concise report responsive to this charge be forwarded to the Fermilab Director by September 1, 2010. Thank you.